TURBOCHARGER G-CHARGER

CHARGE AIR SYSTEM WITH TURBOCHARGER

WARNING: Observe the following for all installations, especially in engine compartment due to dense construction:

- **Route lines of all types (e.g. for fuel, hydraulics, coolant and refrigerant, brake fluid, vacuum) and electrical wiring so that the original path is re-established.**
- **Watch for sufficient clearance to all moving or hot components.**

Turbocharger with attachments, removing and installing

Observe rules for cleanliness. See **RULES OF CLEANLINESS** .

NOTE:

- **All hose connections are secured with clamps.**
- **VAS5024A spring clip installation tool is recommended for installing spring-type clamps.**

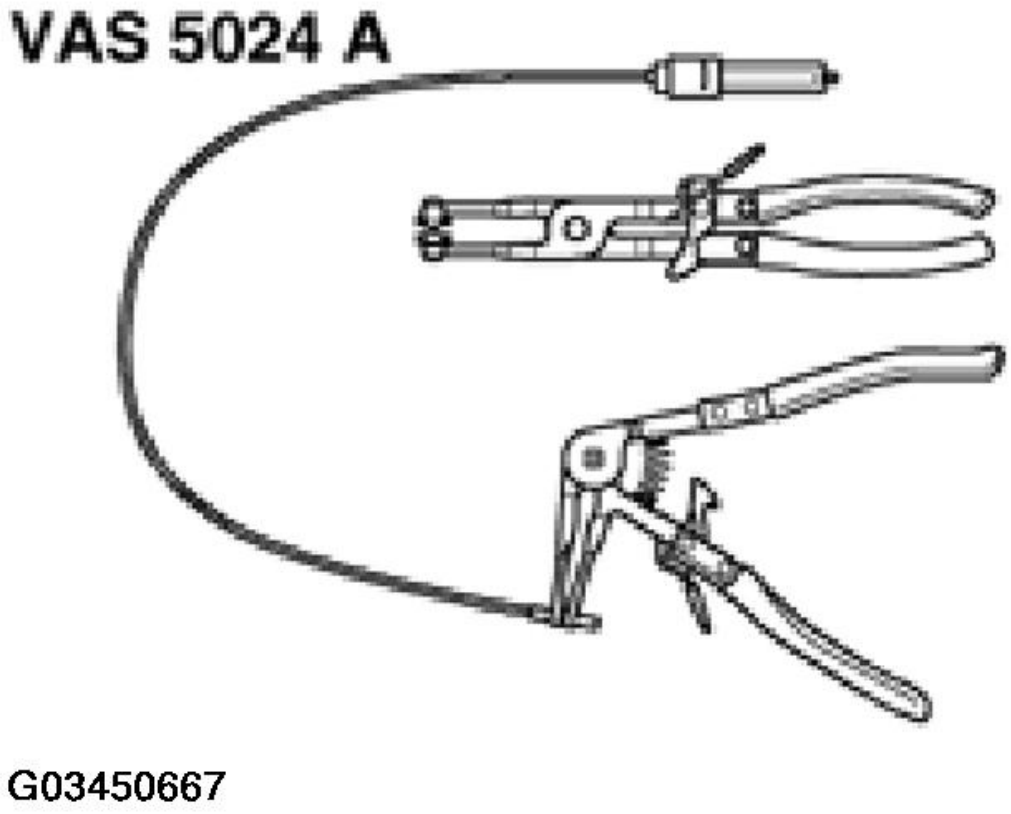


Fig. 1: Identifying Special Tool VAS5024A
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- **Charge air system must be properly sealed.**
- **Charge pressure hoses and pipes as well as their connections must be free of oil and grease before re-installation.**
- **Always replace self-locking nuts.**

Assembly overview

NOTE: The following list refers to Fig. 2 .

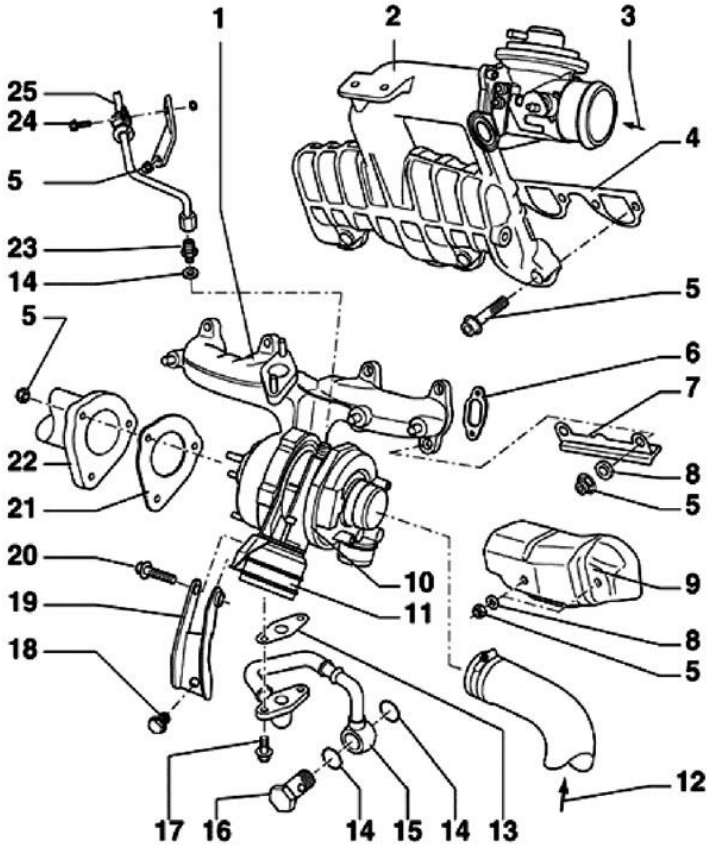
1. **Exhaust manifold**
   - with turbocharger
   - Replace as complete unit only
2. **Intake manifold**

3. **From charge air cooler**
4. **Gasket**
   - replace
   - Coating (bead) to intake manifold
5. **25 Nm**
6. **Gasket**
   - Note installed position
7. **Bracket**
   - For shielding plate, item no. 9
8. **Washer**
9. **Heat shield**
   - Engages in bracket, item no. 7
10. **Turbocharger**
    - Replace as complete unit with exhaust manifold only
    - To remove the exhaust turbocharger, disconnect right drive axle from transmission:

    See **FRONT AXLE SHAFT** .

    - After installing turbocharger, let engine idle for approx. 1 minute without increasing engine speed. This ensures adequate oil supply to the turbocharger.
11. **Vacuum diaphragm**
    - For boost pressure regulation
    - Part of turbocharger, cannot be replaced
12. **From air filter**
13. **Gasket**
    - replace
14. **Seal**
    - replace
15. **Oil return line**
    - to cylinder block
    - new version. See **New version of oil return line and support** .
16. **Banjo fitting, 40 Nm**
17. **15 Nm**
18. **40 Nm**
19. **Brace**
    - Turbocharger - cylinder block
    - new version. See **New version of oil return line and support** .
20. **25 Nm**

21. **Gasket**
    - replace
22. **Front exhaust pipe**
23. **Connecting piece**
    - Coat threads and bolt head contact surface with G 052 112 A3
24. **10 Nm**
25. **Oil supply line**
    - Before installing, fill turbocharger with oil at connection of oil supply line
    - Tighten to 22 Nm



1 - Exhaust manifold
2 - Intake manifold
3 - From charge air cooler
4 - Gasket
5 - 25 Nm
6 - Gasket
7 - Bracket
8 - Washer
9 - Heat shield
10 - Turbocharger
11 - Vacuum diaphragm
12 - From air filter
13 - Gasket
14 - Seal
15 - Oil return line
16 - Banjo fitting, 40 Nm
17 - 15 Nm
18 - 40 Nm
19 - Brace
20 - 25 Nm
21 - Gasket
22 - Front exhaust pipe
23 - Connecting piece
24 - 10 Nm
25 - Oil supply line

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Fig. 2: Exploded View Of Turbo Charger & Exhaust Manifold Components
Courtesy of VOLKSWAGEN OF AMERICA, INC.

New version of oil return line and support

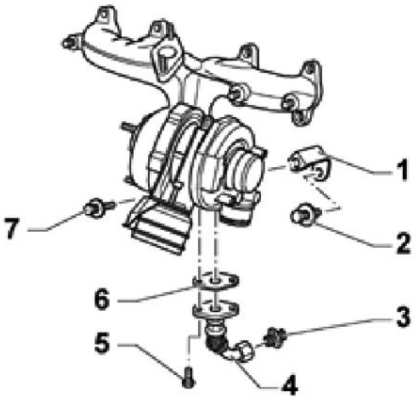
1. Support for turbocharger - cylinder block
2. 40 Nm
3. Connection, 40 Nm
4. Oil return line with union nut

   Tighten to 30 Nm on cylinder block

5. 15 Nm
6. Gasket

   replace

7. 25 Nm



1 - Support for turbocharger - cylinder block
2 - 40 Nm
3 - Connection, 40 Nm
4 - Oil return line with union nut
Tighten to 30 Nm on cylinder block
5 - 15 Nm
6 - Gasket
replace
7 - 25 Nm

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Fig. 3: Identifying Oil Return Line And Support
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Parts of charge air cooler, removing and installing

NOTE:

- **All hose connections are secured with clamps.**
- **Charge air system must be properly sealed.**

NOTE: The following list refers to Fig. 4 .

1. **Connection hose**
2. **Connection tube**

- Charge air cooler/intake manifold
- To remove, remove right headlight

3. **O-ring**
   - Replace if damaged
4. **Intake Air Temperature (IAT) Sensor -G72-**
   - Vehicles of model year 2000 and up at charge air cooler
5. **5 Nm**
6. **Connection hose**
   - Connection pipe/intake manifold
7. **Connection hose**
   - Charge air pipe/turbocharger
8. **10 Nm**
9. **Charge air pipe**
10. **Connection hose**
11. **Bracket**
12. **Charge air cooler**

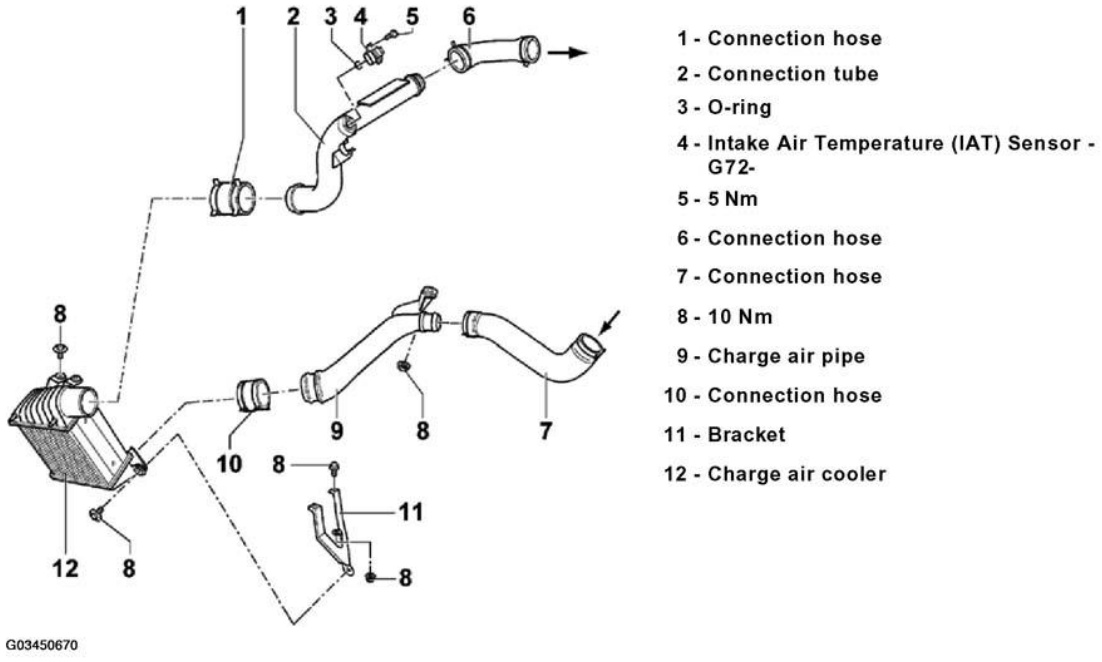
1 - Connection hose
2 - Connection tube
3 - O-ring
4 - Intake Air Temperature (IAT) Sensor - G72-
5 - 5 Nm
6 - Connection hose
7 - Connection hose
8 - 10 Nm
9 - Charge air pipe
10 - Connection hose
11 - Bracket
12 - Charge air cooler
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Fig. 4: Identifying Parts Of Charge Air Cooler Components
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Line connections of turbocharger

NOTE: The following list refers to Fig. 5 .

1. Wastegate Bypass Regulator Valve -N75-
2. To EGR Vacuum Regulator Solenoid Valve -N18-
3. To air filter
4. Vacuum reservoir
5. Vacuum diaphragm for charge pressure regulator valve
6. Turbocharger
7. To Change-over valve for intake manifold flap -N239-
8. Check valve, white connection faces toward Wastegate Bypass Regulator Valve -N75-

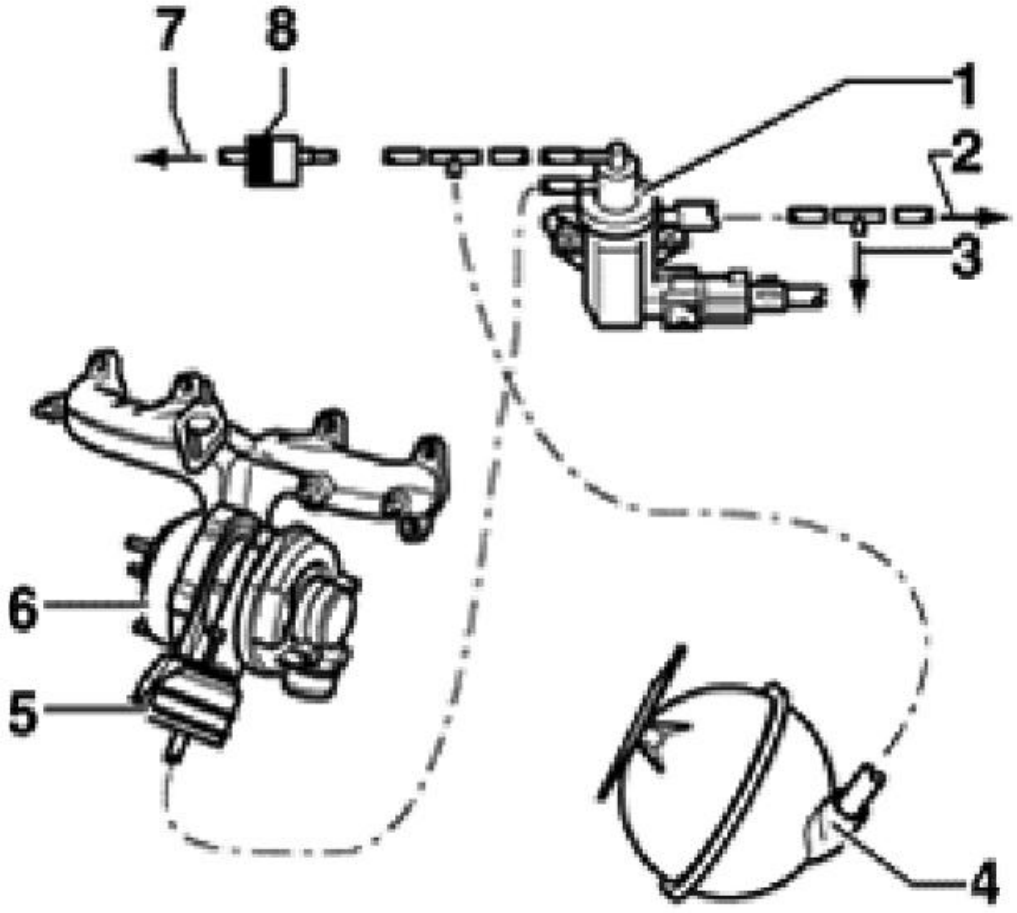

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Fig. 5: Identifying Line Connections Of Turbocharger
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Rules of cleanliness

When working on turbocharger, carefully observe the following "5 Rules of Cleanliness":

- Thoroughly clean all connections and the surrounding area before disconnecting.
- Place parts that have been removed on a clean surface and cover them. Use lint-free cloths only!
- Carefully cover opened components or seal, if repairs are not performed immediately.
- Only install clean components: Only unpack replacement parts immediately prior to installation. Do not use parts that have been stored without packaging (in tool boxes etc.)
- When the system is open: Avoid working with compressed air. Do not move vehicle unless absolutely necessary.

Safety precautions

WARNING: Observe the following for all installations, especially in engine compartment due to dense construction:

- **Route lines of all types (e.g. for fuel, hydraulics, coolant and refrigerant, brake fluid, vacuum) and electrical wiring so that the original path is re-established.**
- **Watch for sufficient clearance to all moving or hot components.**

If test and measuring equipment is required during road test, note the following:

- Test equipment must always be secured to the rear seat and operated from there by a second person.

If test and measuring equipment is operated from the passenger seat, the person seated there could be injured in the event of an accident involving deployment of the passenger-side airbag.

BOOST PRESSURE SYSTEM, CHECKING

Wastegate bypass regulator valve, checking

Recommended special tools and equipment:

- VAG1526 multimeter or VAG1715 multimeter
- VAG1594 connector test kit

Test sequence

- Switch ignition off.
- Disconnect connector (arrow) from wastegate bypass regulator valve.

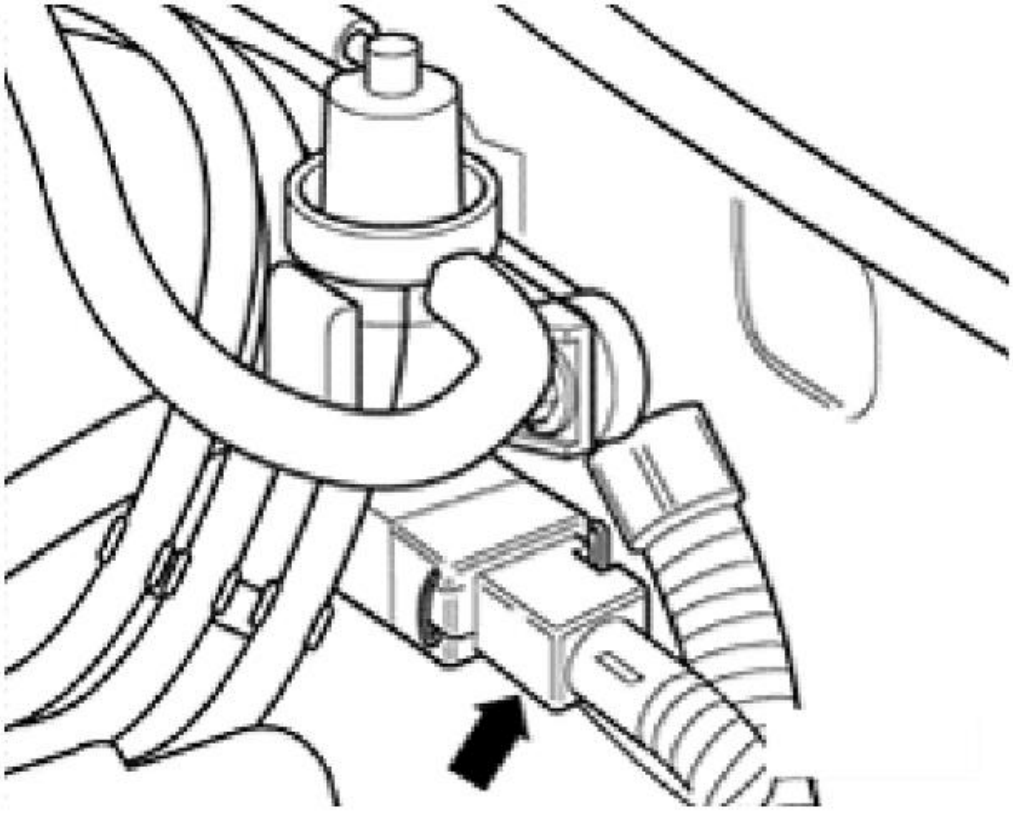

Fig. 6: Disconnecting Connector From Wastegate Bypass Regulator Valve
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Measure resistance between terminals of valve.

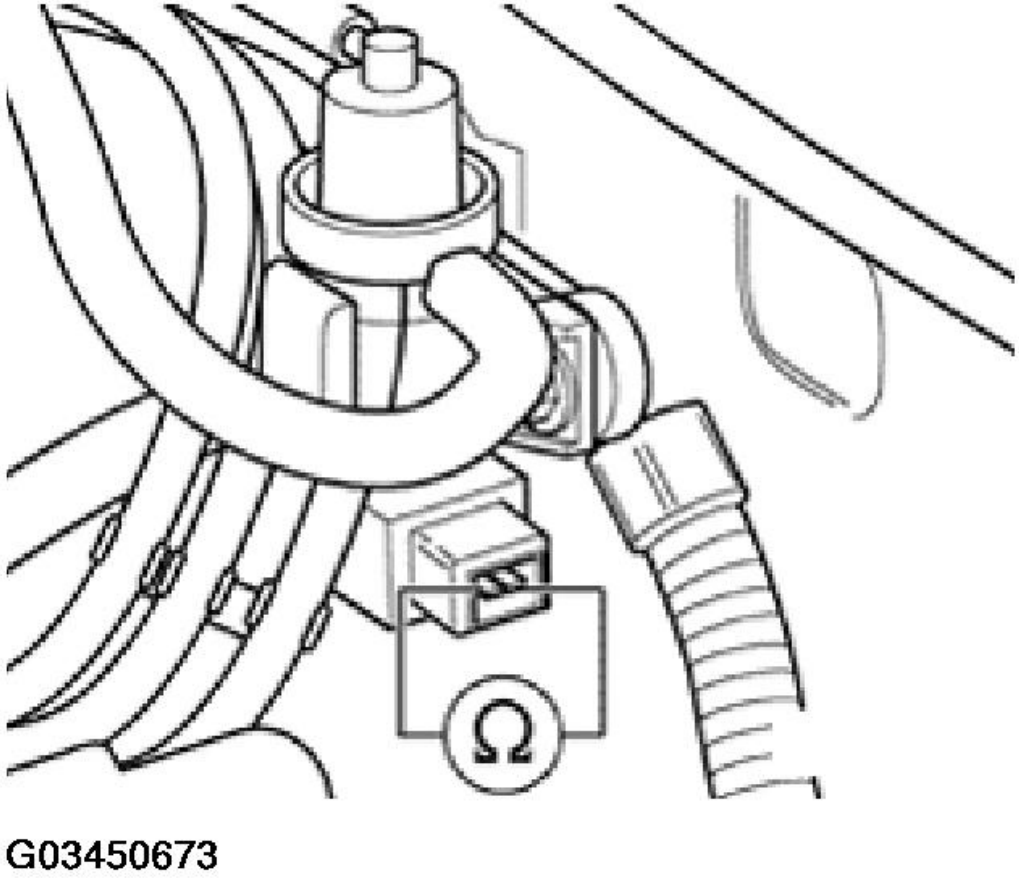

Fig. 7: Measuring Resistance Between Terminals Of Wastegate Bypass Regulator Valve
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Specified value: 14...20 ohm

If specified value is not obtained:

- Replace Wastegate Bypass Regulator Valve -N75-.
- Erase DTC memory of control module for Diesel-Direct fuel injection system. See **DIAGNOSTIC MODE 4: RESET/ERASE DIAGNOSTIC DATA** .
- Generate readiness code. See **READINESS CODE, GENERATING** .

If specified value is obtained:

- Switch ignition on.

- Measure voltage supply of valve at connector terminal 1 and at engine Ground (GND).

  Specified value: approx. battery voltage

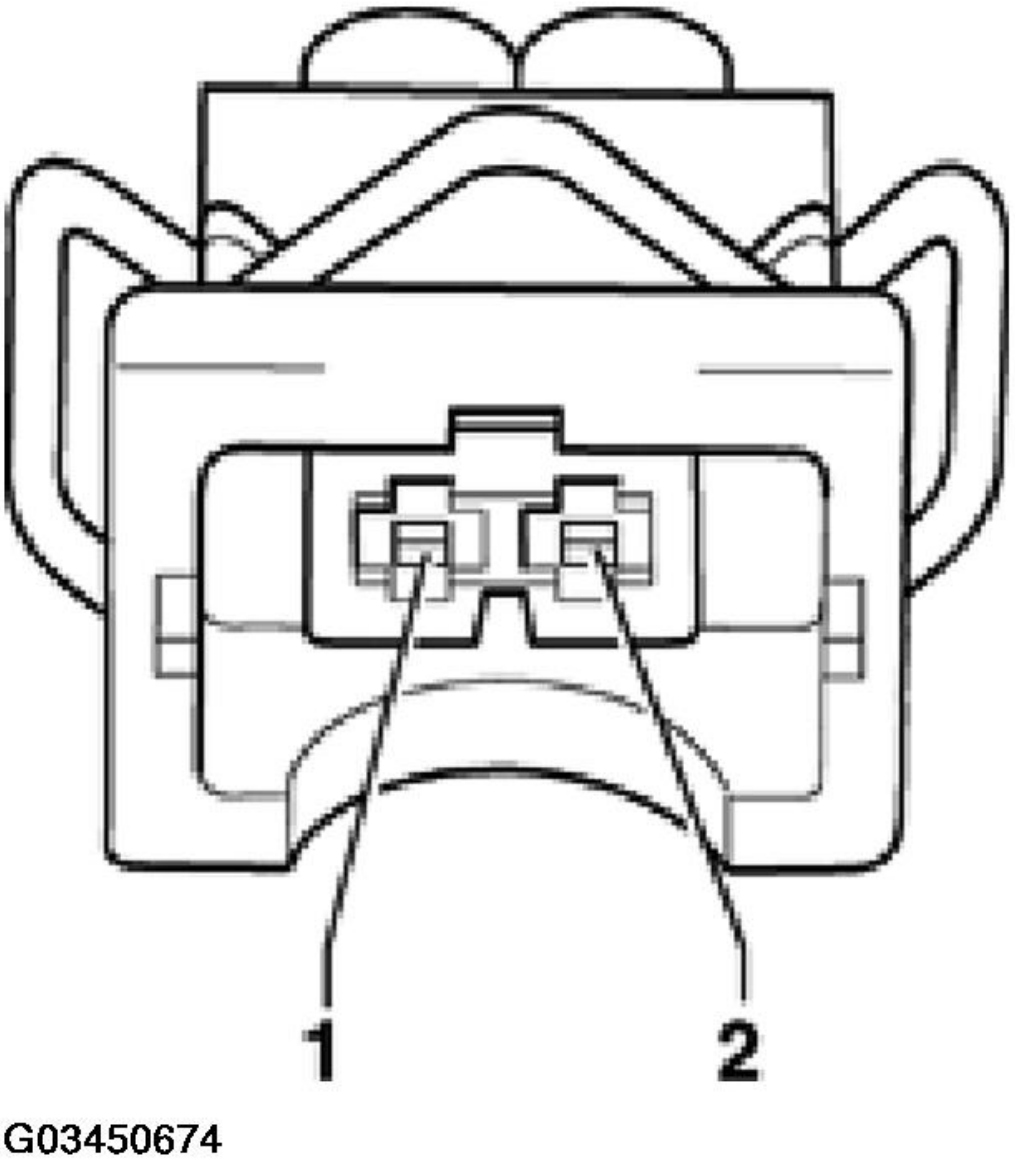

Fig. 8: Identifying Wastegate Bypass Regulator Valve Harness Connector Terminals
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Switch ignition off.

If specified value is not obtained:

- Connect test box to control module wiring harness. See **TEST BOX, CONNECTING FOR WIRING TEST** .

Vehicles with 80-pin control module

- Check for open circuits in wires between test box and connector according to wiring diagram.

  Terminal 1 + socket 2 and 28

  Terminal 2 + socket 15

  Wire resistance: max. 1.5 ohm

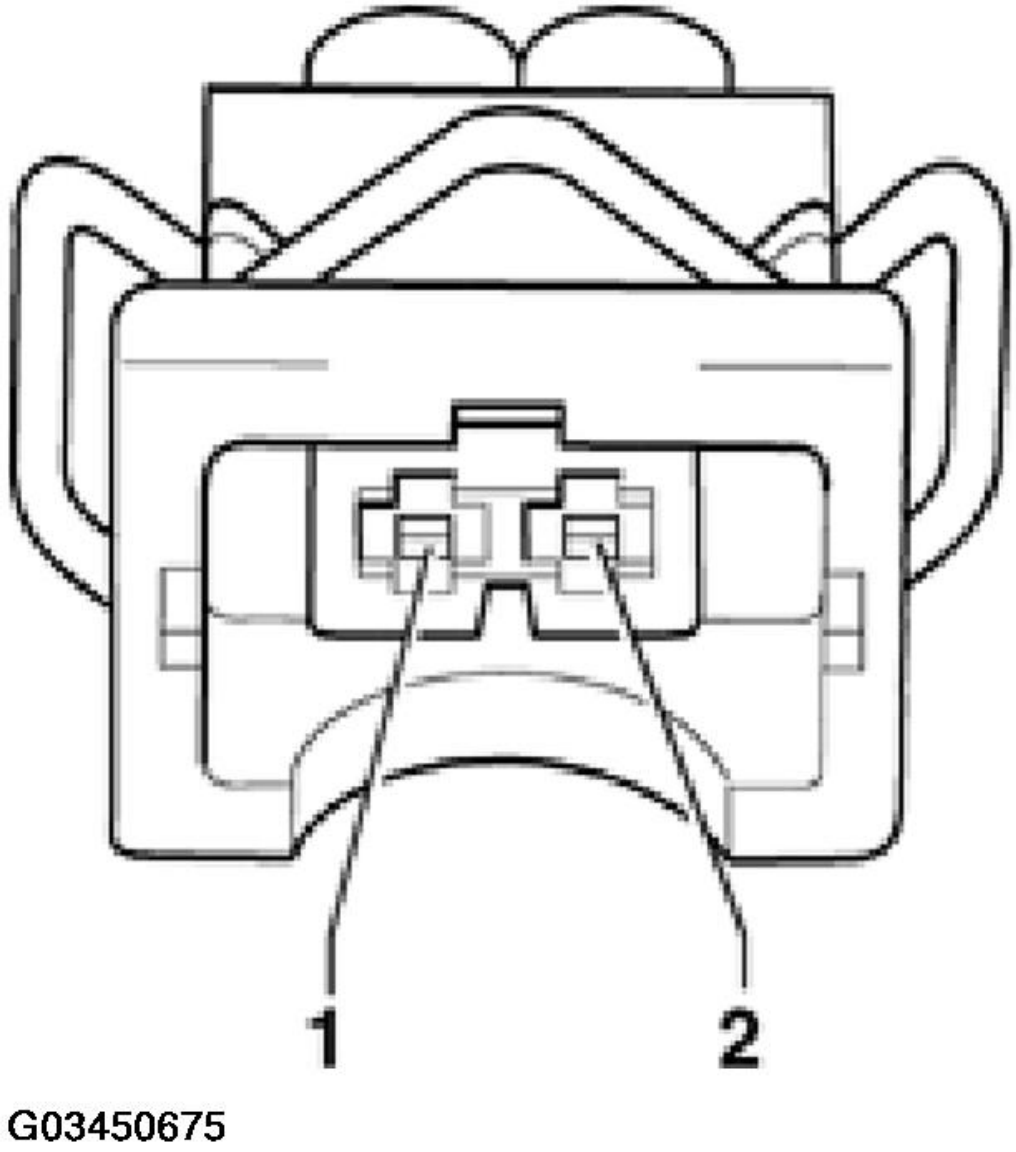

Fig. 9: Identifying Wastegate Bypass Regulator Valve Harness Connector Terminals (80-Pin ECM)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Vehicles with 121-pin control module

- Check for open circuits in wires between test box and connector according to wiring diagram.

  Terminal 2 + socket 62

Wire resistance: max. 1.5 ohm

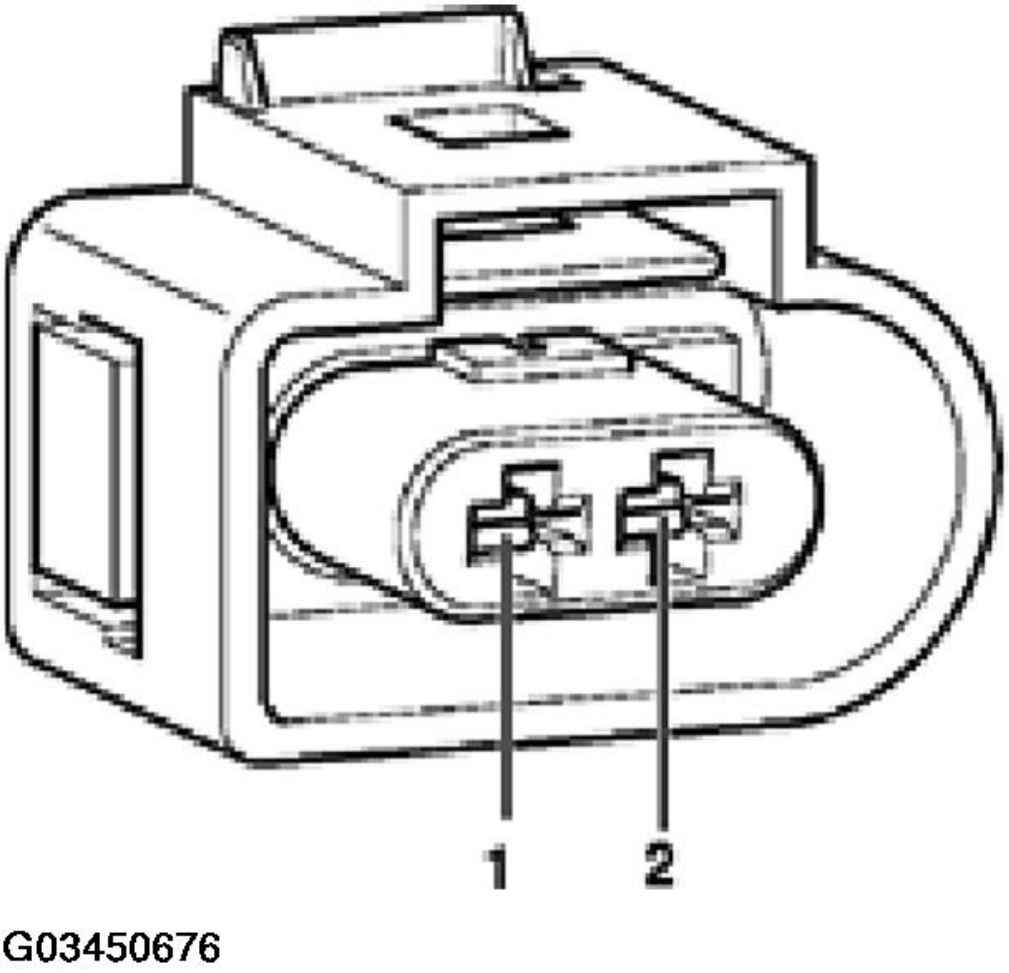

Fig. 10: Identifying Wastegate Bypass Regulator Valve Harness Connector Terminals (121-Pin ECM)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Check the wire to terminal 1 according to wiring diagram.

  See appropriate System Wiring Diagram article.

Continuation for all vehicles

- Also check wires for short circuit to each other, to vehicle Ground (GND) and to B+.

Specified value: INFINITY ohm

If no malfunctions are found in wires:

- Replace Diesel Direct Fuel Injection (DFI) Engine Control Module (ECM) -J248-. See CONTROL MODULE FOR DIESEL-DIRECT FUEL INJECTION SYSTEM, REPLACING .
- Erase DTC memory of control module for Diesel-Direct fuel injection system. See **DIAGNOSTIC MODE 4: RESET/ERASE DIAGNOSTIC DATA** .
- Generate readiness code. See **READINESS CODE, GENERATING** .